

Application No. 10/732,957
Amendment dated October 26, 2004
Reply to Office Action of July 27, 2004

REMARKS

Claims 1-22 were pending in the application. By this amendment, new claims 23-46 are added. The status of the claims is as follows:

Claims 6, 7, 13, and 14 are objected to because of informalities.

Claims 1-4 and 6-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2003/0007138 A1 to Shigematsu, et al. ("Shigematsu").

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Shigematsu in view of U.S. Patent No. 6,113,240 to Iizuka ("Iizuka").

Claims 9, 12-15, 16/9, and 19/9-22/9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Iizuka.

Claims 10, 11, 17, and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Iizuka in view of U.S. Patent No. 5,980,045 to Fujibayashi ("Fujibayashi").

Claims 9-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujibayashi.

Claims 23-46 have been added.

The indication, in the Office Action, that the Examiner has no objections to the drawings filed on December 11, 2003, is noted with appreciation.

The acknowledgement, in the Office Action, of a claim for foreign priority under 35 U.S.C. § 119(a)-(d), and that the certified copy of the priority document has been received, is noted with appreciation.

Claims 1, 6, 9, 13, and 16 have been amended to more distinctly claim the subject invention. The change from "vertical" to "perpendicular" in these claims is supported by paragraph [0032] of the specification. Paragraph [0032], in conjunction with FIG. 1, shows an optical axis, which will be assumed to be parallel to the X-axis. The motion of lens unit 14 is in the plane of the figure, *i.e.*, in a direction parallel to the Y-axis. The

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motion of lens unit 13 is “vertical to the plane of FIG. 1,” *i.e.*, in a direction parallel to the Z-axis. As the Y- and Z-axes will be perpendicular to the X-axis (the optical axis), these changes do not introduce any new matter.

Claims 7 and 14 have been amended to correct a spelling error objected to in the Office Action. These changes are not necessitated by the prior art, are unrelated to the patentability of the invention over the prior art, and do not introduce any new matter. It is believed these spelling corrections overcome the objections noted in the Office Action.

Claim 20 has been amended to correct a grammatical error. This change is not necessitated by the prior art, is unrelated to the patentability of the invention over the prior art, and does not introduce any new matter.

35 U.S.C. § 103(a) Rejections

The rejection of claims 1-4 and 6-22 under 35 U.S.C. § 103(a), as being unpatentable over Shigematsu, is respectfully traversed based on the following.

Claim 1 has been amended to require the driving mechanism to cause the first and second lens units to move in a “continuously reciprocating” manner. The result of this continuous reciprocating motion by the driving mechanism is that the projected image “is periodically shifted by reciprocating the first and second lens units...”

In contrast, Shigematsu does not move either of lens units L24 or L31 in a continuously reciprocating manner. The reason Shigematsu does not move lens units L24 and L31 is clear when the purpose of Shigematsu is considered. Shigematsu deals with retaining a high quality image “even when the illumination conditions and/or the environment is/are changed,” *see* paragraph [0006]. For example, if the environment slowly warms up, the alignment of the projected image will shift. Shigematsu compensates for this shift in the projected image by moving various lens units, thereby keeping the position of the projected image constant. Thus, Shigematsu does not disclose

or suggest moving first and second lens units in a continuously reciprocated manner to cause a periodic shift in the projected image. As Shigematsu does not disclose or suggest a driving mechanism for continuously reciprocating first and second decentering lens units, Shigematsu cannot render obvious the invention of claim 1.

Claims 2-4 and 6-8 depend from claim 1. As Shigematsu does not render claim 1 obvious, Shigematsu cannot render claims 2-4 and 6-8, which depend therefrom, obvious. Claims 2-4 and 6-8 also include additional limitations not disclosed or suggested by Shigematsu. Claim 6 includes the limitation of a "supporter for supporting the lens frame so as to be rotatable..." The Office Action asserts that elements 311a-b and 315-317, illustrated in FIGs. 12 and 13 correspond to such a supporter. Paragraphs [0118] and [0119] disclose that elements 311a-b and 315-317 are "drive elements," *i.e.*, they cause the lens unit to move in a linear direction along the optical axis. Such movement is clearly not a rotational movement as found in the limitation of claim 6, but rather causes the corresponding lens unit to tilt with respect to the optical axis. Further, because the drive elements 311a-b, and 315-317 are not supporters, element 401, the second adjustment means, cannot rotate the lens frame in a plane perpendicular to the optical axis. Lastly, claim 6 includes the limitation that the actuator be opposite the supporter. Without a supporter, Shigematsu's actuator cannot be opposite thereof. Thus, at least three additional limitations of claim 6 are not disclosed or suggested by Shigematsu.

Claim 7 includes the limitation of a guide shaft. The Office Action again asserts that elements 311a-b and 315-317 correspond to guide shafts. However, as just discussed, Shigematsu discloses these drive elements are for moving the lens unit in a linear direction parallel to the optical axis. For this reason, such drive elements would not be fitted in a through hole in the lens frame. Lastly, since Shigematsu does not disclose a guide shaft, it cannot disclose an actuator disposed on the side opposite the guide shaft. Thus, claim 7 is nonobvious over Shigematsu for at least these three additional reasons.

Claim 9, like claim 1, includes a limitation of a driving mechanism that causes the two decentering lens units to be moved in a continuously reciprocating fashion. As with claim 1, the result in claim 9 is that the projected image is periodically shifted by the reciprocating motion of the two decentering lens units. As discussed above, Shigematsu does not disclose or suggest moving two decentering lens units in a continuously reciprocating manner such that the projected image is periodically shifted. Therefore, Shigematsu cannot render obvious the invention of claim 9 as it does not disclose or suggest at least these two limitations of claim 9.

Claims 10-15 depend from claim 9. As Shigematsu does not render claim 9 obvious, Shigematsu cannot render claims 10-15, which depend therefrom, obvious. Claims 10-15 also include additional limitations that are not disclosed or suggested by Shigematsu. Claim 13 corresponds generally to claim 6. As discussed above, Shigematsu does not disclose or suggest a supporter that permits a lens frame to be rotated, an actuator for rotating the lens frame, or an actuator opposite the supporter. Thus, Shigematsu cannot render obvious claim 13 for at least these three additional reasons. Claim 14 corresponds generally to claim 7. As discussed above, Shigematsu does not disclose or suggest a guide shaft, a guide shaft fitted in a through hole, or an actuator opposite the guide shaft. Thus, Shigematsu cannot render obvious claim 14 for at least these three additional reasons.

Claim 16 corresponds to claim 1, but further requires a light valve in which the images displayed by the light valve are changed according to the positions of the first and second decentering lens units. As Shigematsu fails to render claim 1 obvious, for at least the reasons of failing to disclose or suggest a driving mechanism for continuously reciprocating two decentering lens units and causing the projected image to be periodically shifted, Shigematsu fails to render obvious the invention of claim 16 that includes the same limitations. Further, Shigematsu fails to disclose or suggest a light valve in which the images displayed by the light valve are changed according to the positions of two decentering lens units. The Office Action asserts that A(R) shown in FIGs. 15-17 corresponds to a light valve having the required properties. In fact A(R) corresponds to "a

pattern surface of a reticle R,” *see* paragraph [0034]. As the pattern on a reticle used in forming an integrated circuit does not change, such a pattern would not change according to the position of two decentering units. This is in contrast to the position of the projected image of the reticle that would change according to the position of two decentering units. Shigematsu, by failing to disclose or suggest numerous limitations of claim 16 cannot render claim 16 obvious.

Claims 17-22 depend from claim 16. As Shigematsu does not render claim 16 obvious, Shigematsu cannot render claims 17-22, which depend therefrom, obvious. Claims 17-22 also include additional limitations that are not disclosed or suggested by Shigematsu. Claim 20 includes the limitation that the “movements of the first and second decentering lens units cause an image shift of 0.3 to 1 times of a pitch of the image element in a projection image on the projection surface.” As Shigematsu does not disclose or suggest a light valve having pixels, it cannot cause an image shift of 0.3 to 1.0 times the pitch of the projected pixel. Therefore, Shigematsu cannot render obvious claim 20 for at least this additional reason.

The Office Action admits that Shigematsu does not disclose the conditional limitations:

$$0.01 \leq |FR/FD1| \leq 0.2,$$

$$0.01 \leq |FR/FD2| \leq 0.2,$$

$$0.01 \leq |LB/FD1| \leq 0.2, \text{ and}$$

$$0.01 \leq |LB/FD2| \leq 0.2.$$

The Office Action then asserts:

[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to configure the projection system of the Shigematsu reference to fulfill the conditions above, since it has been held that where the general conditions of a claim are disclosed in the prior art,

discovering the optimum or working ranges involves only routing [sic] skill in the art.

As discussed above, however, there are many differences between Shigematsu (an optical system for patterning integrated circuits in a changing environment) and the subject application (a projection system with improved image resolution). As numerous limitations found in the various claims are not disclosed or suggested by Shigematsu, one cannot say that the general conditions of any of the current claims have been disclosed in the prior art reference of Shigematsu. The vast differences between the present application and Shigematsu are most readily evident when FIG. 1 of the present application is compared with FIGs. 1 and 10 of Shigematsu. Thus, by not showing that the above conditional relationships are explicitly or inherently disclosed by Shigematsu, the Office Action fails to establish a *prima facie* case of obviousness as required by MPEP 706.02(j)(D). Therefore, the conditional relationships of claims 1, 9, and 16 provide additional distinctions between the present claims and Shigematsu, further showing the present claims to be nonobvious over Shigematsu.

Accordingly, it is respectfully requested that the rejection of claims 1-4 and 6-22 under 35 U.S.C. § 103(a) as being unpatentable over Shigematsu, be reconsidered and withdrawn.

The rejection of claim 5 under 35 U.S.C. § 103(a), as being unpatentable over Shigematsu in view of Iizuka, is respectfully traversed based on the following.

As discussed above, Shigematsu fails to render obvious the invention of claim 1 for numerous reasons. The combination of Shigematsu and Iizuka also fails to render obvious the invention of claim 1. Iizuka, like Shigematsu, fails to disclose or suggest a driving mechanism that causes two decentering lens units to be moved in a continuously reciprocating fashion. Iizuka also fails to disclose or suggest that the reciprocating motion of two decentering lens units periodically shifts a projected image. Further, Iizuka utterly fails to mention focal lengths of any type, and thus cannot disclose or suggest the two

focal length conditional limitations of claim 1. Therefore, the combination of Shigematsu and Iizuka cannot render obvious the invention of claim 1 as it does not disclose or suggest at least four limitations of claim 1.

It should also be noted that the combination of Shigematsu and Iizuka is improper. Shigematsu relates to an optical projection system used in the production of integrated circuits and is designed to counteract changes in the environment within the fabrication facility such that the position of the projected image remains constant. Iizuka, in contrast, is for an optical projection system for projecting images or video using a pixilated display panel and is designed to allow the position of the projected image to change while retaining high image quality. Thus, Shigematsu and Iizuka are at cross-purposes with each other and would not be combined.

Claim 5 depends from claim 1. As claim 1 is nonobvious over the combination of Shigematsu and Iizuka, claim 5 is nonobvious for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Shigematsu in view of Iizuka, be reconsidered and withdrawn.

The rejection of claims 9, 12-15, 16/9, and 19/9-22/9 under 35 U.S.C. § 103(a), as being unpatentable over Iizuka, is respectfully traversed based on the following.

As discussed above, Iizuka, like Shigematsu, fails to disclose or suggest a driving mechanism that causes two decentering lens units to be moved in a continuously reciprocating fashion. Iizuka also fails to disclose or suggest that the reciprocating motion of two decentering lens units periodically shifts a projected image. Further, Iizuka utterly fails to mention focal lengths of any type, and thus cannot disclose or suggest the two focal length conditional limitations of claim 9. Therefore, Iizuka cannot render obvious the invention of claim 9 as it does not disclose or suggest at least four limitations of claim 9.

Claims 12-15 depend from claim 9. As Iizuka does not render claim 9 obvious, Iizuka cannot render claims 12-15, which depend therefrom, obvious. Claims 12-15 also include additional limitations that are not disclosed or suggested by Iizuka. Claim 13 includes the limitation of a supporter for supporting the lens frame so that the lens frame is rotatable and an actuator for rotating the lens frame about the supporter. The Office Action asserts that elements 15a, 15b, 16a, and 16b are such supporters. Column 6, lines 1-26 disclose that 15a, 15b, 16a, 16b are actually shafts upon which the frames 14 and 15 glide in response to motors 12 and 13. Thus, Iizuka clearly discloses linear motion of the frames on glides, not the rotatable motion found in the limitations of claim 13. Further, the motors of Iizuka are not disposed opposite the supporter, another limitation of claim 13. Therefore, Iizuka does not disclose or suggest at least three additional limitations of claim 13 and cannot render claim 13 obvious for these additional reasons.

Claim 14 includes the limitation of an actuator that is disposed opposite a guide shaft. As Iizuka discloses shafts on either side of the frames, the motors cannot be disposed opposite the guide shaft. For example, FIG. 2 shows motor 12 to be on the same side of the frame as guide shaft 15a. Therefore, Iizuka does not disclose or suggest at least one additional limitation of claim 14 and cannot render claim 14 obvious for this additional reason.

Claims 16/9 and 19/9-22/9 correspond to new claims 23 and 26-29, as claim 23 corresponds to original claim 16, with the limitations of original claim 9. As discussed above, Iizuka fails to disclose or suggest a driving mechanism that causes two decentering lens units to be moved in a continuously reciprocating fashion. Iizuka also fails to disclose or suggest that a projected image is periodically shifted by the reciprocating motion of two decentering lens units. Further, Iizuka utterly fails to mention focal lengths of any type, and thus cannot disclose or suggest the two focal length conditional limitations of claim 23. Therefore, Iizuka cannot render obvious the invention of claim 23 as it does not disclose or suggest at least four limitations of claim 23.

Iizuka also fails to disclose or suggest changing the image displayed on the pixels of a light valve according to the position of the two decentering lens units. Iizuka, in contrast to Shigematsu, does at least disclose a light valve. Paragraphs [0033] and [0034] of the present application disclose how changing the image displayed by the pixels of the light valve as a function of the position of the two decentering lens units increases the resolution of the image on the projection surface. Iizuka clearly has no such similar disclosure or suggestion that the image displayed by the pixels on the light valve should be a function of the position of the two decentering lens units. Iizuka merely changes the position of the decentering lens units, it does not make corresponding changes in the image displayed by the pixels on the light valve. By not disclosing or suggesting such changes in the image displayed by the pixels of a light valve, Iizuka cannot render obvious the invention of claim 23 for a fifth reason.

Claims 26-29 depend from claim 23. As Iizuka cannot render obvious the invention of claim 23, it cannot render obvious the invention of claims 26-29.

Accordingly, it is respectfully requested that the rejection of claims 9, 12-15, 16/9 (new claim 23), and 19/9-22/9 (new claims 26-29) under 35 U.S.C. § 103(a) as being unpatentable over Iizuka, be reconsidered and withdrawn.

The rejection of claims 10, 11, 17, and 18 under 35 U.S.C. § 103(a), as being unpatentable over Iizuka in view of Fujibayashi, is respectfully traversed based on the following.

As discussed above, Iizuka cannot render obvious the invention of claim 9 as it does not disclose or suggest at least three limitations of claim 9. Further, the combination of Iizuka and Fujibayashi fails to render obvious the invention of claim 9. Fujibayashi, like Iizuka, fails to disclose or suggest a driving mechanism that causes two decentering lens units to be moved in a continuously reciprocating fashion. Fujibayashi also fails to disclose or suggest that the reciprocating motion of two decentering lens units periodically shifts a projected image. Further, Fujibayashi fails to mention focal lengths of any type,

and thus cannot disclose or suggest the two focal length conditional limitations of claim 9. Therefore, the combination of Iizuka and Fujibayashi cannot render obvious the invention of claim 9 as it does not disclose or suggest at least four limitations of claim 9.

Claims 10 and 11 depend from claim 9. As the combination of Iizuka and Fujibayashi does not render obvious the invention of claim 9, it cannot render obvious the inventions of claims 10 and 11 for at least the same reasons.

Claim 16, like claim 9, includes the limitations of a driving mechanism for continuously reciprocating two decentering lens units with the result that the projected image is periodically shifted by the reciprocating decentering lens units. Claim 16 also includes two conditional limitations based upon decentering lens focal lengths. As discussed above, the combination of Iizuka and Fujibayashi fails to disclose or suggest all four of these limitations and thus cannot render obvious the invention of claim 16.

Claims 17 and 18 depend from claim 16. As the combination of Iizuka and Fujibayashi does not render obvious the invention of claim 16, it cannot render obvious the inventions of claims 17 and 18 for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claims 10, 11, 17, and 18 under 35 U.S.C. § 103(a) as being unpatentable over Iizuka in view of Fujibayashi, be reconsidered and withdrawn.

The rejection of claims 9-12 under 35 U.S.C. § 103(a), as being unpatentable over Fujibayashi, is respectfully traversed based on the following.

As noted above, Fujibayashi fails to disclose or suggest a driving mechanism that causes two decentering lens units to be moved in a continuously reciprocating fashion. Fujibayashi also fails to disclose or suggest that the reciprocating motion of two decentering lens units periodically shifts a projected image. Further, Fujibayashi fails to mention focal lengths of any type, and thus cannot disclose or suggest the two focal length

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conditional limitations of claim 9. Therefore, Fujibayashi cannot render obvious the invention of claim 9 as it does not disclose or suggest at least four limitations of claim 9.

Claims 10-12 depend from claim 9. As Fujibayashi does not render obvious the invention of claim 9, it cannot render obvious the inventions of claims 10-12 for at least the same reasons.

Accordingly, it is respectfully requested that the rejection of claims 9-12 under 35 U.S.C. § 103(a) as being unpatentable over Fujibayashi, be reconsidered and withdrawn.

New Claims

By this amendment, new claims 23-46 are added. Claim 23 corresponds to original claim 16, rewritten to explicitly include the limitations of claim 9. Claims 24-29 correspond to original claims 17-22, but depend from new claim 23. Thus, claims 23-29 add no new matter. As discussed above, claim 23 is not rendered obvious by the cited prior art as claim 23 includes limitations regarding a driving mechanism for continuously reciprocating the two decentering lens units, resulting in periodically shifting the projected image, and two conditional limitations based upon the focal lengths of the two decentering lens units. Claims 24-29 depend from nonobvious claim 23 and are nonobvious for at least the same four reasons.

New claim 30 generally corresponds to original claim 1, but requires only a single decentering lens unit, and thus only a single conditional limitation regarding the focal length of the decentering lens unit. Claim 30 thus adds no new matter. Claim 30 is not rendered obvious by the cited prior art as claim 30 includes limitations regarding a driving mechanism for continuously reciprocating a decentering lens unit, resulting in periodically shifting the projected image, and a conditional limitation based upon the focal length of the decentering lens unit.

New claim 31 generally corresponds to original claim 9, but requires only a single decentering lens unit, and thus only a single conditional limitation regarding the focal length of the decentering lens unit. Claim 31 thus adds no new matter. Claim 31 is not rendered obvious by the cited prior art as claim 31 includes limitations regarding a driving mechanism for continuously reciprocating a decentering lens unit, resulting in periodically shifting the projected image, and a conditional limitation based upon the focal length of the decentering lens unit.

New claims 32-36 correspond to original claims 4-8, but depend from new claim 30. New claims 32-36 thus add no new matter. As claim 30 is not rendered obvious by the cited prior art, claims 32-36 are considered nonobvious for at least the same reasons as claim 30.

New claims 37-40 correspond to original claims 12-15, but depend from new claim 31. New claims 37-40 thus add no new matter. As claim 31 is not rendered obvious by the cited prior art, claims 37-40 are considered nonobvious for at least the same reasons as claim 31.

New claim 41 corresponds to an image projection apparatus that includes a projection optical system as found in new claim 30. Such an image projection apparatus is generally illustrated in FIG. 1 of the present application and described in paragraph [0028]. New claim 41 thus adds no new matter. As claim 30 is not rendered obvious by the cited prior art, claim 41 is considered nonobvious for at least the same reasons as claim 30.

New claims 42 and 43 correspond to original claims 19 and 20, but depend from new claim 41. New claims 42 and 43 thus add no new matter. As claim 41 is not rendered obvious by the cited prior art, claims 42 and 43 are considered nonobvious for at least the same reasons as claim 41.

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New claim 44 corresponds to an image projection apparatus that includes a projection optical system as found in new claim 31. Such an image projection apparatus is generally illustrated in FIG. 1 of the present application and described in paragraph [0028]. New claim 44 thus adds no new matter. As claim 31 is not rendered obvious by the cited prior art, claim 44 is considered nonobvious for at least the same reasons as claim 31.

New claims 45 and 46 correspond to original claims 19 and 20, but depend from new claim 44. New claims 45 and 46 thus add no new matter. As claim 44 is not rendered obvious by the cited prior art, claims 45 and 46 are considered nonobvious for at least the same reasons as claim 44.

CONCLUSION

Wherefore, in view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and an early reconsideration and a Notice of Allowance are earnestly solicited.

This Amendment increases the number of independent claims by 6 from 2 to 8 (3 previously paid for) and increases the total number of claims by 23 from 23 to 46 (23 previously paid for), but does not present any multiple dependency claims. Accordingly, a Response Transmittal and Fee Authorization form authorizing the amount of \$854.00 to be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260 is enclosed herewith in duplicate. However, if the Response Transmittal and Fee Authorization form is missing, insufficient, or otherwise inadequate, or if a fee, other than the issue fee, is required during the pendency of this application, please charge such fee to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260.

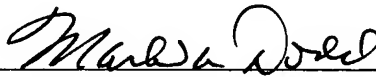
If an extension of time is required to enable this document to be timely filed and there is no separate Petition for Extension of Time filed herewith, this document is to be

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construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) for a period of time sufficient to enable this document to be timely filed.

Any other fee required for such Petition for Extension of Time and any other fee required by this document pursuant to 37 C.F.R. §§ 1.16 and 1.17, other than the issue fee, and not submitted herewith should be charged to Sidley Austin Brown & Wood LLP's Deposit Account No. 18-1260. Any refund should be credited to the same account.

Respectfully submitted,

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